

NASA SBIR/STTR Technologies

A1.01-9814 - RIDES: Raman Icing Detection System

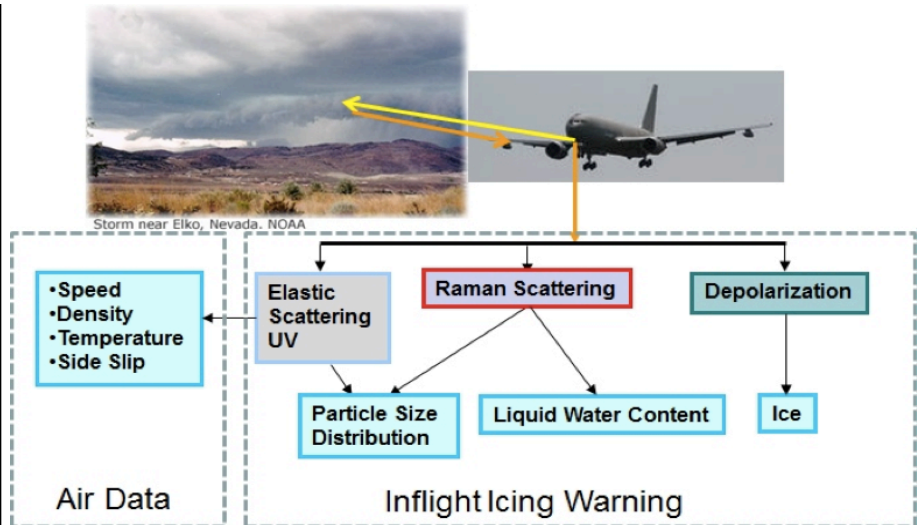


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Identification and Significance of Innovation

Michigan Aerospace Corporation proposes to develop an integrated LIDAR instrument capable of identifying icing conditions while also providing air data sensing capabilities. The resulting Raman Icing Detection System (RIDES) will be an integrated air data sensing and icing condition detection instrument, providing a backup to the Pitot tubes potentially affected by icing, thus providing redundancy for critical information. The proposed solution will operate without protrusions into the flow, behind a flush mounted window on the skin of the aircraft, mitigating the risk of ice build-up during operation.



Estimated TRL at beginning and end of contract: (Begin: 3 End: 4)

Technical Objectives and Work Plan

Technical Objectives:

- 1. Determine the operational envelope of the sensor and the resulting requirements.
- 2. Perform trade studies and photon budgets using models to determine the design parameters of the instrument.
- 3. Design the instrument for fabrication in Phase II.
- 4. Algorithm development for droplet size distribution.

Work Plan:

- Task 1: Requirements Analysis
- Task 2: Sensor Performance Trades and Modeling
- Task 3: Instrument Design
- Task 4: Sensing Algorithm Work
- Task 5: Demonstration Plan for Phase II
- Task 6 (ongoing): Management (Reporting and risk assessment)

NASA Applications

The system resulting from this effort will allow better studies of icing by giving clearer indications of the actual conditions outside a test aircraft in real time, providing safer and more accurate means of studying icing conditions.

Non-NASA Applications

Military and civil aviation is often affected by icing, sometimes severely, and the ability to detect these conditions so as to avoid or at least account for them (activating de-icing systems, etc.) would be of tremendous safety value. Combining the system with an optical turbulence detection and air-data system would result in a robust optical-based sensor suite for modern aircraft.

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NON-PROPRIETARY DATA